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No. 11.

FIRST ANNUAL REPORT

OF THE

HARBOR AND LAND COMMISSIONERS,

FOR THE YEAR

1879.

BOSTON :

Rand, Aberg, & Co., Printers to the Commonwealth,

117 FRANKLIN STREET.

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Commonwealth of Massachusetts.

HARBOR AND LAND COMMISSIONERS' REPORT.

To the Honorable the Senate and the House of Representatives of the Commonwealth of Massachusetts.

THE Board of Harbor and Land Commissioners, in accordance with the provisions of law, respectfully submit their Annual Report for the year 1879.

The Board were appointed under chap. 263 of the Acts of 1879, and entered upon their duties the first day of July, succeeding to the work heretofore in charge of the separate Boards of Harbor Commissioners and Land Commissioners.

This report presents the result of the work of the entire year so far as practicable.

SOUTH BOSTON FLATS.

By this name is known the large area of flats belonging to the Commonwealth beyond the riparian line of the north shore of South Boston, extending from Fort Point Channel to Castle Island, and including some 750 acres.

Prior to 1869 the southerly bound of the Commonwealth's property adjoining the property of the Boston Wharf Company had not been adjusted; but in that year it was definitely settled. The line to which filling could be extended had also been then determined. And in that year a sale of what is now known as the 25-acre piece was made to the Hartford and Erie Railroad for the sum of \$515,505, or fifty cents per foot. At the close of that year a further sale of about 50 acres, next easterly of the 25-acre piece, was also sold to the Boston and Albany Railroad at twenty cents per

foot. For the purchase by the Hartford and Erie Railroad, a note secured by mortgage was taken; and by agreement the Boston and Albany was to pay for its land on the first day of October, 1872, either in cash, or in its bonds bearing six per cent interest, payable semi-annually, and agreed, "unless, for good cause shown," to build a substantial sea-wall upon the northerly side of its purchase, and to complete the whole filling of the 50-acre lot on the first day of October, 1875.

In December, 1871, the Hartford and Erie Railroad having failed to comply with the conditions of its mortgage, and not having paid its note, the land sold to it in 1869 was purchased at a mortgagee's sale by the Treasurer in behalf of the Commonwealth.

In 1873 the Boston and Albany Railroad, having neither paid the money for its purchase, nor even commenced the work of filling and walling, alleging "good cause" therefor, a new contract was made with that corporation by the Commonwealth. By this contract the time for filling was extended to Oct. 1, 1876, at which date the purchase-money was to be paid, and the whole work completed; and no interest was to be charged from Oct. 1, 1872, to Oct. 1, 1876, in consideration of the stipulations and agreements contained in this supplementary contract, and in the four-part contract of the same date between the Boston and Albany Railroad, the Boston Wharf Company, the city of Boston, and the Commonwealth; and by these contracts the Commonwealth agreed to fill and wall the 25-acre piece, and to do certain other things. [The contracts of 1869 and 1873 may be found in House Doc. of 1878, No. 21.]

Prior to the formation of this Board, the Land Commissioners had demanded from the Boston and Albany Railroad the purchase-money due in October, 1876, and had collected in April, 1878, the sum of three hundred and thirty thousand dollars on account. After that date there had been much correspondence, which may be found in House Doc. 21 of 1878, and in the Second Report (1879) of the Land Commissioners; but, when this Board was organized, no settlement had been made.

The early attention of this Board was given to this subject: but as a proposition had been made by the New York and New England Railroad to purchase the 50-acre lot from

the Boston and Albany Railroad, and to assume some of, or all, the obligations of the Boston and Albany to the Commonwealth, and negotiations were pending between these parties, a settlement of the matter was delayed by request of the Boston and Albany Railroad; and it was not until late in September that active negotiations were commenced between the New York and New England Railroad and this Board. At first the proposition by that corporation was to purchase a portion of the 25-acre piece, to alter the plan for filling the 50-acre piece, to construct the Northern-avenue Bridge, and to extend the time of the lease. While this proposition was under consideration, another proposition was made by the New York and New England Railroad,—to settle all the claims of the State against the Boston and Albany Railroad, to purchase the 12-acre piece and the 25-acre piece, and to build the Northern-avenue Bridge for its own use, by a promise of the New York and New England Railroad to pay to the Commonwealth at some future and undetermined date the sum of five hundred thousand dollars, which should remain at two per cent interest for five years, at three per cent interest for the next five years, and at four per cent interest for the next five years, “and as much longer as the Commonwealth may choose to let the debt run;” no deed of the land to be given until the five hundred thousand dollars with accrued interest were fully paid: but a full release was to be given to the Boston and Albany Railroad.

As the claim of the Commonwealth against the Boston and Albany Railroad, exclusive of any claim for damages, and the cost of material already placed in the 12-acre lot at the low contract price of the Boston and Albany Railroad, would amount to about a hundred and fifty thousand dollars,—leaving for the 12-acre piece partially filled, and for the 25-acre piece filled and walled at a cost to the State of nearly a million of dollars, only three hundred and fifty thousand dollars, or about twenty-one and a half cents per foot,—the proposition was declined.

Subsequently it was proposed to have the price fixed by two gentlemen, both named by the corporation: but this proposition was also declined, because, if the price proposed to be paid was approximate to the estimate by the New

York and New England Railroad of the value of the land, it was clear to the Board that the time for sale had not arrived; and, besides, there was land contiguous to the State's land, held by private parties, which could be purchased by the corporation, if it so desired.

It was suggested, that, because the State owned some stock in the New York and New England Railroad, that corporation should be treated more liberally than other parties; but this was not assented to by the Commissioners, who failed to see why a round sum should be allowed, one-sixth of which, if the Commonwealth were at liberty at any time to sell its stock, and so avail of any benefits received by the corporation, would go to the State, while five-sixths would go to the other owners of the stock, provided the property of the corporation shall in the future exceed its bonded debt. If not, the whole gift would be to the bondholders.

But there is another and even a stronger reason why the Board could not consent to sell any of these lands, either to this railroad or to any other party, at a price below their real value; which is, that they are pledged as security to the holders of Massachusetts scrip.

When the State, already burdened by the use of her credit for the cost of the war and the Hoosac Tunnel, was compelled to borrow still more money for these purposes, she, by solemn enactment of law, pledged these lands to the payment of the war loan and the Hoosac Tunnel loan. These loans are not yet fully paid; and, until they shall be, this Board does not consider it any part of its duty as agents of the State in the first place to assent, and then to ask the consent of the Governor and Council, to any disposition of these lands, by which the proceeds of the pledged securities of the State shall be diminished, and the good faith of the State violated.

During the negotiations of this Board with the New York and New England Railroad, it became evident that it was hopeless to wait any longer for a settlement to be made between that corporation and the Boston and Albany Railroad; and that, in order to secure an earlier completion of the work upon the 50-acre lot, and its occupancy for business purposes, it was necessary for this Board to settle the outstanding account between the State and the Boston and Albany

Railroad without delay. To secure such result, a communication was at once sent to the Boston and Albany Railroad, asking for a prompt settlement of the account. Since then the various items thereof have been examined and discussed; and it is expected, that, in a very short time, the amount due from that corporation, except what is due for damages caused by its delay, will be paid into the treasury of the State. It is obvious that the whole amount of damage caused by this delay cannot be computed until the delay ceases.

With the approval of the Governor and Council, a contract (a copy of which is annexed) was made with Boynton Brothers for the filling of B Street; and a portion of the work has been done.

In addition to the flats already described, the State purchased of the riparian proprietors, under chap. 446 of 1869, all the flat between B and E Streets, except the interest of two parties (as fully described in the First Report of the Land Commissioners), for the sum of \$243,091.41.

The expenditures upon the South Boston Flats, as given in the Second Annual Report of the Land Commissioners (December, 1878), were \$1,004,237 28

In 1879 there have been expended, —

By Land Commissioners	22,637 02
Governor and Council (Clapp & Ballou)	81,202 73
Harbor and Land Commissioners	2,846 01
	\$1,110,923 04
The Boston and Albany has paid on account . .	\$330,000
The New York and New England Railroad	
has paid for rent	6,500
	336,500 00
Leaving	
	\$774,423 04

as the net cost to the State, exclusive of interest.

The 25-acre piece is the only land filled and now ready for occupancy. Had the Boston and Albany Railroad completed the filling of the 50-acre piece, as it agreed to do, the 25-acre piece would now have been accessible, of present value, and ready for sale, because a bridge would have already connected it with the city proper. Under the supposition that this bridge would speedily be built, there have been applications for the property from both purchasers and

lessees,—the purchasers at a price per foot above the average cost, and the lessees at rates much beyond the price now paid by the New York and New England Railroad. But, until some arrangement can be made to secure the Northern-avenue Bridge, the property is inaccessible, except by water, or by a circuitous route over land belonging to another party. The rental now paid by the New York and New England Railroad is ridiculously low for so valuable a piece of property, and the continuance of the present lease can be justified, if at all, only because the State cannot now guarantee to any purchaser or lessee free access to the property, except by water. Whenever deemed advisable, the present lease can be terminated by a twelve months' notice.

At present the New York and New England Railroad is the only railroad which connects with the property at South Boston, and is, apparently to the public, the only purchaser; but other parties with large capital have already notified this Board of their desire to make arrangements for the occupancy of these flats.

And here this Board would proceed to call your attention to the connection of these flats with existing railroads, were it not, that, by the action of the last legislature, that subject was referred to a special commission, consisting of the Board of Railroad Commissioners and this Board.

But, in considering the value of this property, it is well to remember that the present terminal facilities which can be used for shipping freight received from the West, owned or controlled by the Boston and Albany, the Fitchburg, and the Lowell Railroads, below bridges, and exclusive of South Boston, are less than 50 acres in all: while in Baltimore two railroads use over 200 acres; in Philadelphia the Pennsylvania Railroad controls two miles of water-front; and in Jersey City the Erie and Pennsylvania Railroads together occupy 250 acres, besides the large grounds near Amboy; and the New York Central has recently secured land enough in the city of New York to give it a water-front of over 3,000 feet. If Boston is to be a shipping port, and intends to secure its share of Western business, it is time to prepare these grounds for occupancy, and to provide by law for reaching them.

BACK BAY LANDS.

The whole quantity of land in the Back Bay, so called, belonging to the State in 1857, was	FEET. 4,723,998
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Prior to Dec. 1, 1879, there had been do- nated to scientific institutions	FEET. 144,738
Transferred to Trinity Church	6,447
Transferred to city of Boston	163,555
Devoted to streets and passage-ways	2,037,068.6
Sold, as per statement annexed	2,084,931.6
Leaving unsold Dec. 1, 1879	287,257.8
	4,723,998

The gross proceeds of the land sold have been	\$4,307,722 17
The rights of the State in Parker Street have been sold for	2,200 00

Making the total gross receipts	\$4,309,922 17
The cost of filling, grading, &c. (see Land Commissioners' Second Report), prior to 1879, was	\$1,626,008 71
The cost of auction sales, &c., to July 1, 1879, as per sales-book, was	14,291 78
	1,640,300 49

Net proceeds to Dec. 1, 1879	\$2,669,621 68
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From this it appears, that, while only 44.13 per cent of the whole quantity of land belonging to the State has been sold (the remainder, except 287,257.8 feet unsold, having been given away or used in streets, &c.), the Commonwealth has already received a net profit of 56.51 cents per square foot for every foot owned by it in 1857; while the 2,084,931.6 feet of land sold have averaged \$2.066 per square foot gross, and, after deducting all expenses of filling, 4,723,998 feet have yielded a net profit of \$2,669,621.68, or \$1.28 per square foot sold.

Annexed to this report will be found a plan of the Back Bay lands, showing the date and price at which every foot of land belonging to the Commonwealth has been sold.

During May last the Land Commissioners sold at auction 32,868 feet of land upon Commonwealth Avenue for \$109,883.68, and, at private sale, 2,863½ feet for \$7,158.75.

The prices at which these sales were made were considered high, and from that time a better feeling existed in regard to

the value of Back Bay lands, although prior to Oct. 20 there was no active demand for land; but, within thirty days after, sales were made of—

33,739.5 feet on	.	.	.	.	Commonwealth Avenue.
31,192	"	.	.	.	Marlborough Street.
11,177.6	"	.	.	.	Beacon Street.
2,352	"	.	.	.	Newbury Street.

In all 78,461.1 feet, for \$242,270.75.

Upon these sales there were no charges of any kind, the Commissioners having made the sales without the intervention of brokers.

The land belonging to the Commonwealth, and still unsold, is all beyond Dartmouth Street, and is located as follows:—

				FEET.	
Marlborough Street, north side	.	.	.	22,377.6	
Marlborough Street, south side	.	.	.	25,345.6	
					47,723.2
Commonwealth Avenue, north side	.	.	.	9,810.6	
Commonwealth Avenue, south side	.	.	.	16,185	
					25,995.6
Newbury Street, north side	.	.	.	45,808	
Newbury Street, south side	.	.	.	46,928	
					92,736
Boylston Street, north side	.	.	.	46,928	
Boylston Street, south side	.	.	.	73,875	
					120,803
Total square feet	.	.	.	.	287,257.8

For the land upon Newbury and Boylston Streets, there is as yet no active demand; but, whenever the extension of those streets to the new park shall be completed, a ready sale at good prices is expected.

For the land upon Commonwealth Avenue and Marlborough Street, an early sale is anticipated at improving prices.

BRIDGES OVER COLE'S RIVER AND LEE'S RIVER.

The Fall River, Warren, and Providence Railroad Company, under the provisions of chap. 241 of the Acts of 1879, submitted for the approval of this Board plans for the reconstruction of its bridges over Cole's River and Lee's River

without draws. Notice was given to the selectmen of Swansey and Somerset, and a public hearing was had on the 24th of July. The selectmen of both towns appeared in opposition to closing the draws, and a strong local feeling was shown in favor of retaining them in both bridges.

At the hearing, the counsel for the remonstrants claimed that the Act of 1879 was unconstitutional; that a State has no power to authorize a bridge without a draw across a navigable river constituted by United States legislation a part of one of its ports. It was urged, that, as the Act was not mandatory, but conferred discretionary power only, if the authorities showed that the approval of a bridge without a draw would not protect the petitioner in erecting such bridge, such approval should be refused. The very important bearing of the question thus presented upon all the duties of the Board, as well as the weight of the suggestion of counsel in relation to the exercise of discretionary power, led to a somewhat careful examination of the authorities. For convenient reference hereafter, it may be useful to state briefly the result of this examination.

The limitation of State authority is supposed to arise from the provision of the Constitution of the United States, which gives to Congress power "to regulate commerce with foreign nations, and among the several States, and with the Indian tribes." The final and authoritative interpretation of this provision must be sought in the decisions of the Supreme Court of the United States. Its meaning was considered by that Court in *Gibbons v. Ogden*, 9 Wheat., 1, decided in 1824, wherein it was held that a State law, giving to certain persons for a term of years exclusive right to navigate the waters of that State with boats moved by steam or fire, was inoperative against the laws of the United States regulating the coasting trade. In the opinion by Marshall, C.J., the Court says, "The power of Congress, then, comprehends navigation within the limits of every State in the Union, so far as that navigation may be in any manner connected with commerce with foreign nations, or among the several States, or with the Indian tribes." The Court, however, declined to decide whether the power conferred upon Congress was exclusive, or whether a concurrent power over the same subject remained with the

States, as in either case, if the State law was in conflict with that of Congress, it must yield, inasmuch as the Constitution by express provision declares that it and the laws made in pursuance thereof are the supreme law of the land. The supremacy of Congress in the regulation of foreign and interstate commerce has been confounded with the exclusive control of it; and, in several cases, *Gibbons v. Ogden* has been cited by the same Court as having established the law that the power of Congress over the subject was exclusive. In *Willson v. the Blackbird Creek Marsh Co.*, 2 Pet., 250, however, a State law authorizing a dam across a navigable creek was held valid; and the Court said the power of Congress to regulate commerce with foreign nations, and among the several States, had not been so exercised as to affect the question, though the plaintiffs were owners of a vessel regularly licensed and enrolled for the coasting trade. The question was more fully considered in *Gilman v. Philadelphia*, 3 Wall, 713, decided in 1865. The power of Congress to control navigable waters that are accessible to interstate commerce, to keep them open and free from obstruction interposed by the States or otherwise, was asserted in this case as unequivocally as in any previous case; but it was fully recognized that the States have concurrent power over the same waters, qualified only by the supreme control which Congress may exercise; and State legislation authorizing a bridge without a draw over the Schuylkill River was held valid. It was admitted that the bridge would obstruct important navigation, and that it and the river above it were within the port of Philadelphia; yet the Court not only thought it competent for the State to permit and regulate the building of such a bridge, but that the State was the appropriate power to exercise the control required. The Court use this language: "It must not be forgotten that bridges, which are connecting parts of turnpikes, streets, and railroads, are means of commercial transportation, as well as navigable waters, and that the commerce which passes over a bridge may be much greater than would ever be transported on the water it obstructs. It is for the municipal power to weigh the considerations which belong to the subject, and to decide which shall be preferred, and how far

either shall be made subservient to the other. The States have always exercised this power; and, from the nature and objects of the two systems of government, they must always continue to exercise it, subject, however, in all cases, to the paramount authority of Congress whenever the power of the States shall be asserted within the sphere of the commercial power which belongs to the nation." It is true the Court were not unanimous in this decision, and a very earnest dissenting opinion was given by one of the judges; but the question was again carefully considered in *Pound v. Turck*, 95 U. S., 459, decided in 1877, and the doctrine of *Gilman v. Philadelphia* was re-affirmed as the settled law.

In the case before the Board, the railroad passing over the bridges extends into Rhode Island, and the business over it is largely interstate commerce. There would seem to be no greater reason for apprehending that Congress would interfere in behalf of commerce passing under the bridges to require draws, than in behalf of that passing over them to prohibit draws.

The only ground, aside from the legal position taken, urged for requiring draws in the bridges to be rebuilt, was the possibility that greater use might hereafter be made of the rivers. As the Act of 1879 contains adequate provision for obtaining a draw in either or both of the bridges whenever the circumstances should justify or require it, the Board determined that until otherwise ordered neither of said bridges should have a draw, and approved plans accordingly.

HARBOR LINE.

In the last Annual Report the subject of the study of the harbor lines, with a view to such redetermination of them as might appear, upon examination, to be desirable, was submitted as a sequence to the elaborate surveys which had been made. Since the completion of the maps, the Board have made a careful study of all the results of the resurvey together with a full consideration of the former harbor line, not only in reference to the defective data for its identification, but of the nearly obsolete and disadvantageous nature and location of many parts of it, and are fully con-

firmed in the conclusion that a revised and redetermined line is necessary for the proper legal and physical supervision of the harbor.

In view of the various projects for the treatment of Charles-river Basin, and from the fact that harbor lines have recently been established in that portion of the river, the Board deem it inexpedient to present any restatement of the harbor line above West Boston Bridge. The provisional legislation relating to South Bay is also sufficient for the action of the Commonwealth in regard to it, and no restatement of the harbor line is needed above Dover-street Bridge. In view of the projects for the improvement of the flats and frontage at and beyond East Boston, the Board deem it best to await further developments before dealing with this side of the harbor, in order that their own action may harmonize with other improvements.

The harbor line presented at this time provides for the frontage of the city proper only, including the city side of Fort Point Channel and Charles River, between Dover-street and West Boston Bridges; and also for the opposite side of Charles River, from West Boston Bridge to the Navy Yard. The Board have substantially concurred in the scheme prepared, at their request, for this portion of the frontage by Professor Henry L. Whiting, in regard to which he says, —

“ Without entering into a discussion of the principles of compensation or the complicated physical condition of the harbor, it is important to state, that the new harbor line so closely follows the present configuration of the harbor outline, as formed by actual structures, most of which have been standing for so long a time, that the impressions due to their condition and position have already been effected; that no physical influences, caused by such slight deviations from existing outlines as occur, have been taken into account. The project has been based, mainly, upon the adjustment of water-spaces to symmetrical lines of frontage best adapted to navigation and occupation. Where the revised harbor line does deviate from the former line and from existing outlines, it is for the purpose of correcting irregularities, and improving the general alignment of the harbor frontage.

“ In order that the revised harbor line may clearly and in fact define the *actual limits of the harbor*, it has been so projected that it will in no case fall *within* any *existing structure*, except where it may cross the lines of bridges. In some cases it coincides with the outer faces of wharf structures as they now exist; and many of the initial points or points of deflection in it are coincident with the outer corners of present wharves;

and the line has been projected with a view to the extension of other wharf and sea-wall structures to it; and it is desirable, if such structures are so brought out, they should coincide as nearly as practicable with the harbor line, while in no case should they extend beyond it."

After due consideration, the Board deem it expedient to recommend but one harbor line; and, although the suggestions by Professor Whiting of two parallel lines to define the coping and foundation lines of frontage structures have features of advantage, they are in a measure technical; and one line with proper restrictions seems sufficient to practically define the harbor outlines, and accords with all the precedents of similar legislation. The line now presented corresponds with, and is intended to be, a *coping line*, or a line with which the coping line of structures may coincide, but shall in no case exceed.

Professor Whiting further says, —

"An important feature in the work is the accurate determination and permanent marking of the points in the harbor line. Experience has proved that reference to local objects, even of apparently stable character, is insecure; and this fact was one of the reasons and requirements for a resurvey of the wharf-lines of the upper harbor, and for basing it upon the costly and perfectly determined triangulation of the United States Coast Survey, — the main points in this triangulation being so securely marked as to preserve them from the probable contingencies of accident. It was also a feature in the scheme of the resurvey to connect each initial point or point of deflection in the harbor line with the points in the harbor triangulation; in fact, to make the points of deflection in the harbor line actual points of triangulation. A practical difficulty, however, arises in the execution of this plan, from the fact that many of the points of deflection in the harbor line will fall in *water*. It became necessary, therefore, to locate and determine a point on some actual structure which would be accessible for instrumental occupation, and where local markings could be made as near as practicable to such points of deflection in the harbor line as could not be marked, and to make these points of triangulation '*reference points*' from which the points of deflection in the harbor line could be determined by measured or computed distance and direction."

This work has been done, and a series of reference points selected and marked, and the references to the points in the harbor line effected. With the execution of the observations and computations connecting these points of reference with the harbor triangulation, the work will be complete. The geographical position of each reference point, and of each

point in the harbor line, will then be given in tables similar to those for the same class of data published in the last report of the Board.

The work of selecting and marking the reference points, and the observations and computations connecting them with the points in the harbor line, has been executed by Mr. William E. McClintock with a degree of precision which has given to these final minute determinations the same exact character as the accurate bases from which they are derived.

The only important deviation from the general trend and location of the former harbor line occurs on the Charlestown side of Charles River, between the northern terminus of the Boston and Lowell Railroad passenger bridge and the Sheares Wharf of the United States Navy Yard.

Along this portion of the harbor frontage, the former system of harbor lines, prescribing the boundaries of Miller's River and Prison Point Bay, is no longer required; and the filling up of these water-spaces, for which compensation has been made, gives to the remaining water-way, which was formerly the entrance to Miller's River, the character of a dock, and as such it has been considered, so far as projecting the harbor line across its entrance is concerned.

By chap. 277 of the Acts of 1879, the Hoosac Tunnel Dock and Elevator Company were authorized to take or purchase the wharves and docks between Tudor's Wharf and the Navy Yard, and, subject to the approval of this Board, to extend its wharves beyond the harbor line. Nothing but an extraordinary commercial need could have justified the powers conferred upon this company; and it would require no less exigency to justify this Board in approving the extension of structures at this point into the deepest water of the harbor front, and at the narrowest point of the entrance to Charles River. The Board have very carefully considered the objections to the extension desired; but they recognize that there would be small encouragement for perfecting and preserving the harbor if it could not be adapted to the necessities of modern methods of commerce. The apathy of corporations and business-men in regard to the required provision for railroad terminal grounds on the waterfront, and their want of faith in the growth of the export business, have seemed to this Board and its predecessors sur-

prising. If there is arising a recognition of the pressing character of this need in any quarter, and a disposition of any parties to prove their faith in the business by providing facilities from the expenditure of their own money, asking no gift or aid from the public treasury, it is important that the fullest freedom should be given to such enterprise consistent with the guarding of what is essential to the safety of the harbor. Weighing these considerations carefully, and consulting the best scientific authority to which it had access, the Board has reached the conclusion, that, for the important purpose to promote which the legislature thought proper to give the right of eminent domain, the desired extension may be permitted. If the extension is made for this purpose, it is desirable that the line should be continuous from Charles-river Bridge to the Navy Yard; and the line is revised accordingly. The revision of the line above Charles-river Bridge, in connection with that below, will enable the Fitchburg Railroad Company to improve their terminal facilities, in connection with the Elevator Company, without serious additional disadvantages to the physical functions of the harbor.

Before drawing the lines, as herein prescribed, the Board gave public notice to all parties interested, as required by statute; and on the 18th of December a public hearing was afforded thereon, at which there were no objections or dissenting criticism made. Whereupon the Board report the following harbor line for the consideration of the legislature, and recommend that it be established by statute:—

The points which are points of deflection, and designated by the letters A, B, C, A^a, B^a, C^a, &c, and the points of reference from the said points of deflection, designated A', A'', A''', B', B'', B''', A', A'', A''', &c., in the following description of the harbor line, are drawn upon the map showing the said harbor line, and are written in the book of recorded data relating thereto in corresponding letters at the points indicated.

Each point of reference, where it is not an existing object, is marked in the substance and on the surface of the ground or structure where the point is located by a copper tack driven through a hole in the centre of an iron plate; said iron plate being about six inches square, and having the

words "Harbor Line" cast in the surface of each plate. In all cases where the points of deflection in the harbor line fall upon actual structures, they are also marked by similar copper tacks and iron plates.

The bearing, from the points of deflection in the harbor line to any point of reference, is in each case the angle with a line parallel to the true meridian passing through the State House, measured from south around by west; the geographical position of the State House being latitude $42^{\circ} 21' 27''.62$, longitude $71^{\circ} 03' 30''.00$.

The distances are given in feet and decimals.

The harbor line on the frontage of the city proper begins at point A on the northerly side of Dover-street Bridge, at its junction with the face of the wharf, and is marked by a copper tack through an iron plate on the face of the capsill, and is referred to points A' and A''. A' is on the plank sidewalk on the southerly side of Dover-street Bridge, and is marked by a copper tack through an iron plate: the bearing from point A to A' is the same as the harbor line between the points A and B. Point A'' is at the south-easterly corner of a brick building at the north-easterly corner of Dover and Albany Streets: distance from points A to A'', 122.54 feet; bearing from point A to A'', $104^{\circ} 46' 23''$.

Thence the harbor line runs northerly to point B, which is at the northerly corner of Pope's upper wharf, and is referred to point B' on the capsill of Pope's lower wharf, and is marked by a copper tack through an iron plate: distance from B to B', 35.60 feet; bearing from B to B', $198^{\circ} 03' 19''$.

Thence the harbor line runs northerly to point C, which is at the southerly corner of Furber & Bailey's wharf, and is referred to point C' on the capsill of the same wharf, and is marked by a copper tack through an iron plate: distance from C to C', 38.00 feet; bearing from C to C', $290^{\circ} 00' 20''$.

Thence the harbor line runs northerly to point D, which is at the southerly corner of Gutterson's wharf, and is referred to point D' on the northerly corner of Hamm's wharf, and is marked by a copper tack through an iron plate on the capsill: distance from D to D', 48.78 feet; bearing from D to D', $39^{\circ} 32' 04''$.

Thence the harbor line runs northerly to point E, which is near the intersection of the southerly side of Broadway

Bridge and the face of the wharf, and is referred to point E' on the southerly corner of the Boston and Albany Railroad wharf under Broadway Bridge, and is marked by a copper tack through an iron plate on the diagonal corner-brace framed into the capsill of the wharf: distance from E to E', 36.92 feet; bearing from E to E', $236^{\circ} 26' 53''$.

Thence the harbor line runs northerly to point F, which is at the angle in the Boston and Albany Railroad wharf about 100 feet below Broadway Bridge, and is referred to point F' on the capsill of the same wharf, and is marked by a copper tack through an iron plate: distance from F to F', 0.45 feet; bearing from F to F', $181^{\circ} 14' 42''$.

Thence the harbor line runs northerly to point G, which is at the face of the Boston and Albany Railroad wharf, at its intersection with the harbor line between the points G and H; said point G being about $24\frac{1}{2}$ feet from the corner of the same wharf, and is referred to points G' and G''. Point G' is on the harbor line between the points G and H, where said last-named line crosses the Old Colony Railroad bridge, and is about 65 feet south-westerly from the corner of a freight-shed, and is marked by a copper tack through an iron plate: distance from G to G', 206.18 feet; bearing from G to G' is the same as the harbor line between the points G and H. Point G'' is on the capsill of the same wharf as point G, and is marked by a copper tack through an iron plate: distance from G to G'', 22.78 feet; bearing from G to G'', $226^{\circ} 54' 57''$.

Thence the harbor line runs northerly to point H, which is the point of commencement of a curve in the harbor line of 338 feet radius; the harbor lines between the points G and H and between the points I and K being tangent thereto. The radius of curve is 338 feet; the length of tangent is 109.29 feet; the arc passed through is $35^{\circ} 50' 16''$. Point H is referred to point H' on northerly side of Federal-street Bridge, where the harbor line between the points G and H crosses said Federal-street Bridge, and is marked by a copper tack through an iron plate on the face of the capsill; also by a copper tack in the outside corner of the sidewalk cap: distance from H to H', 186.02 feet; bearing from H to H', the same as the harbor line between the points G and H.

Thence the harbor line runs northerly on an arc of a circle of 338 feet radius to point I, which is the point of termination of the curve whose point of commencement is at point H. Said point I is near Austin Wellington's wharf, and is referred to point I' on the southerly side of Mount Washington Avenue Bridge, where the harbor line between the points I and K crosses said Mount Washington Avenue Bridge, and is marked by a copper tack through an iron plate: distance from I to I', 464.84 feet; the bearing from I to I' is the same as the harbor line between the points I and K.

Thence the harbor line runs northerly to point K, which is at the angle in the outer face of Otis's wharf, about 80 feet south-westerly from the Pioneer Floating Dry Dock, and is referred to points K' and K''. Point K' is on the capsill of Otis's wharf, and is marked by a copper bolt through an iron plate: distance from K to K', 0.58 feet; bearing from K to K', $146^{\circ} 55' 52''$. Point K'' is at the south-easterly brick corner of a brick building on the northerly side of the entrance to Arch Wharf: distance from K to K'', 160.34 feet; bearing from K to K'', $62^{\circ} 11' 47''$.

Thence the harbor line runs northerly to point L, which is at the southerly corner of Long Wharf, and is referred to points L', L'', and L'''. Point L' is also on the same southerly corner of the said Long Wharf, and is marked by a copper tack through an iron plate on the capsill: distance from L to L', 0.59 feet; bearing from L to L', $105^{\circ} 43' 35''$. Point L'' is at the south-easterly corner of a brick building at the outer end of the said Long Wharf: distance from L to L'', 218.23 feet; bearing from L to L'', $107^{\circ} 57' 48''$. Point L''' is at the south-westerly corner of the same building last named; bearing from L'' to L''', $78^{\circ} 10' 43''$.

Thence the harbor line runs northerly to point M, which is at the northerly corner of Long Wharf, and is referred to points L'' and L''' before described, and also to point M' on the northerly corner of the said Long Wharf: distance from M to L'', 259.92 feet; bearing from M to L'', $53^{\circ} 42' 05''$: distance from M to M', 1.09 feet; bearing from M to M', $52^{\circ} 02'$.

Thence the harbor line runs northerly to point N, which is on the northerly corner of Union Wharf, and is referred to

point N' on the same northerly corner of the said Union Wharf, and is marked by a copper tack through an iron plate on a three-inch-thick false cap, which is spiked to the capsill of the wharf: distance from N to N', 1.29 feet; bearing from N to N', $26^{\circ} 01' 05''$.

Thence the harbor line runs northerly to point O, which is at the southerly corner of Battery South Wharf, and is referred to point O' on the same southerly corner of the said Battery Wharf, and is marked by a copper tack through an iron plate on the front capsill: distance from O to O', 1.53 feet; bearing from O to O', $179^{\circ} 29'$.

Thence the harbor line runs northerly to point P, which is at the northerly corner of Battery South Wharf, and is referred to point P' on the planking at the same northerly corner of the said Battery South Wharf, and is marked by a copper tack through an iron plate: distance from P to P', 2.43 feet; bearing from P to P', $29^{\circ} 44' 14''$.

Thence the harbor line runs northerly to point Q, which is at the southerly corner of Constitution Wharf, and is referred to point Q' on the same southerly corner of the said Constitution Wharf, and is marked by a copper tack through an iron plate: distance from Q to Q', 5.14 feet; bearing from Q to Q', $130^{\circ} 15'$.

Thence the harbor line runs westerly to point R, which is at the northerly corner of Constitution Wharf, and is referred to point R' on the planking at the same northerly corner of the said Constitution Wharf, and is marked by a copper tack through an iron plate: distance from R to R', 2.15 feet; bearing from R to R', $72^{\circ} 37'$.

Thence the harbor line runs easterly to point S, which is near the easterly corner of Fisk's wharf, about in the line of the easterly side of the wharf produced, and is referred to point S' on the outer end of the said Fisk's wharf, near a derrick, and is marked by a copper tack through an iron plate: distance from S to S', 87.95 feet; bearing from S to S', $95^{\circ} 25' 02''$.

Thence the harbor line runs westerly to the point T, which is near the angle in the outer face of Bartlett's south wharf, and is referred to point T' on the same outer point of the said Bartlett's south wharf, and is marked by a copper tack through an iron plate. Point T is also referred to a

point in the triangulation of 1877-78, called "Gray's wharf," which is at the north-westerly corner of a brick building on the said Gray's wharf: distance from T to T', 10.24 feet; bearing from T to T', $67^{\circ} 12' 15''$: distance from Gray's wharf to T', 68.44 feet; bearing from Gray's wharf to T', $12^{\circ} 28' 44''$.

Thence the harbor line runs westerly to point U, which is at the westerly corner of Bartlett's north wharf, and is referred to point U', which is on the easterly corner of the said Bartlett's north wharf, and is marked by a copper tack through an iron plate on the planking of the wharf: distance from U to U', 108.10 feet; bearing from U to U', $268^{\circ} 55' 43''$.

Thence the harbor line runs westerly to point V, which is at the angle in the outer face of the wharf of the Boston Gas-Light Company, about 187 feet from the easterly line of the last-named company's land, and is referred to point V' on the sill of the easterly coal-shed, and is marked by a copper tack through an iron plate: distance from V to V', 34.82 feet; bearing from V to V', $337^{\circ} 00' 22''$.

Thence the harbor line runs westerly to point W, which is at the angle in the outer face of the wharf of the Boston Gas-Light Company, next westerly from the angle at the point V last described, and is referred to point W' on the sill used as a guard on the west side of a passage-way between two coal-sheds on the said Gas-Light Company's wharf, and is marked by a copper tack through an iron plate: distance from W to W', 45.51 feet; bearing from W to W', $294^{\circ} 10' 23''$.

Thence the harbor line runs westerly to point X, which is at the westerly side of Charles-river Bridge at its intersection with the wharf-line, and is marked by a copper tack through an iron plate on the capsill outside of the sidewalk.

Thence the harbor line runs westerly to point Y, which is at the easterly side of Warren Bridge, about 17 feet northerly from the outer face of Lovejoy's wharf, and is marked by a copper tack through an iron plate on the capsill outside of the sidewalk.

Thence the harbor line runs westerly to point Z, which is at the easterly side of the Boston and Maine Railroad bridge, where it intersects the face of the wharf at the head of the dock, and is marked by a copper tack through an iron plate.

Thence the harbor line runs westerly to point A^a , which is at the easterly side of the Eastern Railroad bridge, about 138 feet northerly from the head of the dock, and is marked by a copper tack through an iron plate, and is also referred to point A' at the north-easterly corner of the Boston and Lowell passenger station, at the outer corner of the stone plinth of the buttress: distance from A^a to A' , 138.03 feet; bearing from A^a to A' , $33^\circ 43' 08''$. A^a is also referred to A'' , which is at the westerly side of the Boston and Lowell Railroad passenger bridge at the intersection with the northerly face of the said Boston and Lowell freight bridge, and is marked by a copper tack through an iron plate on the capsill; said point A'' being in the alignment of the harbor line between the points A^a and B^a .

Thence the harbor line runs westerly to point B^a , which is at the northerly side of the Boston and Lowell freight bridge, where it begins to curve, and is marked by a copper tack, and is also referred to point B' , which is on the same northerly side of the said Boston and Lowell freight bridge, and in the alignment of the harbor line between the points A^a and B^a produced, and is marked by a copper tack through an iron plate on the capsill: distance from B^a to B' , 36.18 feet; bearing from B^a to B' , the same as line between points A^a and B^a .

Thence the harbor line runs westerly to point C^a , which is at the northerly side of Craigie's Bridge, about 16 feet south-easterly from the old draw-pier, and is marked by a copper tack through an iron plate, and is also referred to point C' , which is at the easterly corner of the stone step to a brick building at the intersection of the easterly side of Charles Street and the southerly side of Leverett Street: distance from C^a to C' , 221.52 feet; bearing from C^a to C' , $320^\circ 28' 19''$.

Thence the harbor line runs southerly to point D^a , which is at the northerly corner of the wharf between Poplar and Allen Streets, and is referred to points D' and D'' . Point D' is at the southerly side of the scale-frame at the entrance from Charles Street to the Boston Gas-Light Company's wharf, and is marked by a copper tack through an iron plate: distance from D^a to D' , 248.32 feet; bearing from D^a to D' , $259^\circ 09' 31''$. Point D'' is at the corner of a brick building

at the angle in the easterly side of Charles Street, about 122 feet northerly from the northerly side of Poplar Street: distance from D^a to $D^{a''}$, 339.5; bearing from D^a to $D^{a''}$, $257^\circ 54' 35''$.

Thence the harbor line runs southerly to point E^a , which is at the northerly side of West Boston Bridge at its intersection with the sea-wall, and is marked by a copper tack through an iron plate on the cap outside of the brick sidewalk, and is also referred to points E^a' and $E^{a''}$. Point E^a' is at the north-easterly corner of the brick building on the south-westerly corner of Charles and Cambridge Streets: distance from E^a to E^a' , 136.11 feet; bearing from E^a to E^a' , $297^\circ 08' 38''$. Point $E^{a''}$ is at the south-westerly corner of the jail-yard fence about 80 feet northerly from the north-westerly corner of a brick building on the north-easterly corner of Charles and Cambridge Streets: distance from E^a to $E^{a''}$, 188.52 feet; bearing from E^a to $E^{a''}$, $253^\circ 23' 22''$.

The harbor line on the frontage of Cambridge and Charlestown begins at point A, at the northerly side of West Boston Bridge at its intersection with the face of the wharf, and is marked by a copper tack through an iron plate on the cap outside of the brick sidewalk.

Thence the harbor line runs north-easterly to point B, which is on the southerly side of Craigie's Bridge at its intersection with the face of the wharf, and is marked by a copper tack through an iron plate on the cap outside of the sidewalk, and is referred to point B' , which is at the south-easterly corner of the Boston and Lowell machine-shop: distance from B to B' , 73.39 feet; bearing from B to B' , $224^\circ 46' 19''$.

Thence the harbor line runs north-easterly to point C, at the southerly side of the Boston and Lowell Railroad passenger bridge at its intersection with the face of the wharf, and is marked on the capsill of the bridge by a copper tack through an iron plate.

Thence the harbor line runs easterly to point D, which is at the westerly side of Warren Bridge, about 100 feet southerly from the outer face of the wharf on the same easterly side of the said Warren Bridge, and is marked by a copper tack through an iron plate.

Thence the harbor line runs easterly to point E, which is at the easterly side of Charles-river Bridge, about 80 feet

southerly from the outer face of Tudor's wharf on the same easterly side of the said Warren Bridge, and is marked by a copper tack through an iron plate.

Thence the harbor line runs north-easterly to point F, which is about 80 feet south-easterly from the south-westerly corner of Hittenger's wharf, and nearly in the alignment of the westerly side of said Hittenger's wharf produced, and is referred to point E: distance from point F to point E, 379.00 feet; bearing from point F to point E is the same as the harbor line between said points E and F.

Thence the harbor line runs north-easterly to point G, which is at the south-westerly corner of the Navy Yard Shear's Wharf, and is referred to point G', which is near the same south-westerly corner of the said Navy Yard Shear's Wharf, and is marked by a copper tack through an iron plate: distance from G to G', 1.40 feet; bearing from G to G', $150^{\circ} 35' 00''$.

OFFICE AND FIELD WORK.

The routine work connected with the harbor duties of the Board, and the number of licenses granted, have been beyond the general average of former years. About one-quarter of the whole number of structures authorized to be built have been in Boston Harbor and vicinity: the remaining structures licensed have been distributed among the other harbors of the Commonwealth. This result of the yearly business of the Board shows an encouraging demand for harbor occupation, and the increase of facilities in them. The engineers of the Board have been fully engaged in field examinations, surveys, and office work.

The following statistics show the particulars of the work:—

Plans approved by the Board of Harbor Commissioners and the Board of Harbor and Land Commissioners, during the Year 1879, for the Erection of Structures in or over the Tide-Water, and Licenses granted for such Structures.

Nos.

451. Frank R. Kimball, for leave to construct a stone pier in front of his upland on Marblehead Neck. Approved Jan. 8, 1879.
452. John E. Wennerberg, for leave to construct a pile-wharf in Gloucester Harbor. Approved Jan. 8, 1879.
453. Alfred P. Norwood, for leave to construct a pile-wharf in Smith's Cove, East Gloucester. Approved Jan. 29, 1879.
454. John F. Wonson & Co., for leave to construct a pile-wharf in Smith's Cove, East Gloucester. Approved Jan. 29, 1879.
455. Daniel Gill, for leave to construct a pile-wharf in Smith's Cove, East Gloucester. Approved Jan. 29, 1879.
456. Sidney W. Oakes and Elisha M. Oakes, for leave to construct a pile-wharf in Smith's Cove. Approved Jan. 29, 1879.
457. Pigeon Hill Granite Company, for leave to build a breakwater and wharf in Rockport Harbor. Approved Feb. 5, 1879.
458. City of Boston, for leave to rebuild the draw-pier in Essex Street, or Cottage Farm Bridge, crossing Charles River. Approved Feb. 19, 1879.
459. Boston and Lowell Railroad Corporation, for leave to construct additions to its freight-bridge on the Boston side between its bridge and Craigie's Bridge. Approved March 12, 1879.
460. City of Boston, for leave to rebuild and enlarge the steamboat-wharf on Deer Island, Boston Harbor. Approved March 19, 1879.
461. Selectmen of the town of Falmouth, for leave to extend the bridge across the channel leading from Wood's Holl, Great Harbor, into the Mill Pond. Approved March 19, 1879.
462. Onset Bay Grove Association, for leave to construct a bridge over Swift's River in the town of Wareham. Approved March 19, 1879.
463. Jane A. Nelson, for leave to construct a wharf on Rocky Neck, Gloucester Harbor, partly solid and partly on piles. Approved March 19, 1879.
464. Old Colony Railroad Company, for leave to widen Derrick Wharf on Taunton Great River, city of Fall River. Approved March 26, 1879.
465. William E. Ansell, for leave to construct a pile-wharf on Rocky Neck, Gloucester Harbor. Approved April 2, 1879.
466. Putnam Nail Company, for leave to construct a pile-wharf in front of its works on Neponset River. Approved April 2, 1879.
467. Butchers' Slaughtering and Melting Association, for leave to fill solid a portion of its wharf on Charles River. Approved April 9, 1879.
468. Massasoit Steam Mill, for leave to extend its wharf on Taunton Great River, city of Fall River. Approved April 9, 1879.

Nos.

469. County Commissioners of Plymouth County, for leave to construct a pile-bridge across Green Harbor River in the town of Marshfield. Approved April 12, 1879.
470. Selectmen of Medford, for leave to build a stone bridge across Mystic River in place of Craddock Bridge. Approved April 30, 1879.
471. City of Taunton, for leave to rebuild its bridge across Taunton River at Weir Village. Approved April 30, 1879.
472. City of Cambridge, for leave to construct a ballast-wall on Charles River on the south side of Main Street, Cambridge. Approved May 7, 1879.
473. Jeffries Club, for leave to drive piles to keep its float-stage in position at Jeffries Point, East Boston. Approved May 14, 1879.
474. Samuel Downer, for leave to widen his southerly wharf at Downer Landing in the town of Hingham. Approved July 10, 1879.
475. William Johnston, for leave to build a wharf at the foot of Sixth Street, South Boston Point. Approved May 28, 1879.
476. Boston, Winthrop, and Point Shirley Railroad Company, for leave to construct its road around Winthrop Head to Point Shirley. Approved May 28, 1879.
477. Joseph K. Baker, for leave to widen his wharf on Nantucket Sound in the town of Dennis. Approved June 4, 1879.
478. Lewis C. Swift, for leave to construct a stone pier at Wood's Holl, Great Harbor. Approved June 11, 1879.
479. Selectmen of Westport, for leave to construct a solid wharf on the south side of Hicks's Bridge, across Westport River. Approved June 11, 1879.
480. Ignatius A. Kelly, for leave to drive piles to keep a float-stage in position at north side of Jeffries Point, East Boston. Approved June 18, 1879.
481. T. Bullen & Son, for leave to extend their wharf on Merrimac River, city of Haverhill. Approved June 18, 1879.
482. City of Boston, for leave to construct a sea-wall across a part of Roxbury Canal. Approved June 25, 1879.
483. J. H. Brown, for leave to extend his wharf in Marblehead Harbor. Approved June 25, 1879.
484. Latimer S. and F. W. Seaver, for leave to construct a pile-wharf on Plymouth Long Beach. Approved June 28, 1879.
485. Staples and Phillips, for leave to extend their wharf on Taunton River at Weir Village, city of Taunton. Approved July 17, 1878.
486. City of Boston, for leave to construct embankments, sea-walls, wharves, and other structures in connection with the system of improved sewerage at Old Harbor Point, Dorchester Bay. Approved July 28, 1879.
487. Proprietors of Boston Pier, or Long Wharf, for leave to widen its present wharf on the southerly side. Approved Aug. 7, 1879.

APPENDIX.

1

APPENDIX.

[A.]

THIS indenture, made this sixth day of September in the year eighteen hundred and seventy-nine by and between the Commonwealth of Massachusetts, acting by its Board of Harbor and Land Commissioners, subject to the approval of the Governor and Council, party of the first part, and Jesse Boynton of Providence in the State of Rhode Island, and Lyman Boynton of Boston in the Commonwealth of Massachusetts, copartners under the firm name of Boynton Brothers, parties of the second part, witnesseth that the said parties of the second part hereby covenant and agree with said party of the first part to fill B Street on the South Boston Flats, from Eastern Avenue to First Street, to grade thirteen, with material dredged from the harbor, and to do said filling in accordance with the lines, grades, and instructions which shall be given by the engineer of the Harbor and Land Commissioners, and to furnish all necessary aid and materials for giving said lines and grades.

Said filling within the area of B Street shall be protected on the sides by extending the same at the same grade six feet beyond the location, and thence sloping to the existing grade of the flats by a slope of eight to one on the easterly side, and four to one on the westerly side, except that the party of the first part may, at its election, provide other means of retaining the filling on either side or on any portion of the same, in which case the parties of the second part will not be required to protect the filling at the point where such other provision is made. The material for said filling shall be dredged from the harbor at such places as shall be assigned by the engineer of the Harbor and Land Commissioners, and by uniform excavation to the depth of twenty-three feet at mean low water; and both the dredging and filling shall be executed to the satisfaction of the said engineer. Said parties of the second part covenant and agree to commence the execution of said work within thirty days from date hereof, and to prosecute the same with all reasonable despatch, and to complete the same on or before the first day of July next.

Said party of the first part hereby covenants and agrees with said parties of the second part to pay them for said filling at the rate of thirty-three and three-quarters cents per cubic yard measured in the work when completed. Monthly estimates of the work executed will be

made, and eighty per cent of the contract price paid thereon, the remaining twenty per cent to be retained till the completion and final measurement of the work.

It is expressly agreed that no material outside of the limits of the slopes herein provided shall be paid for; and the plan hereto annexed and signed by said Harbor and Land Commissioners and by said parties of the second part shall form the basis of measurement of the work when completed, and be binding upon both parties as the true representation of the existing grade at the commencement of the work.

The party of the first part reserves the right to construct one or more sluice-ways across said street, for the passage of the tide to and from the space west of the same.

It is expressly agreed, that, in the event of the failure of said parties of the second part to complete the said work on or before the first day of July next, the said parties of the second part shall pay to said party of the first part fifty dollars for each and every day beyond said first day of July, until the completion of said work.

In testimony whereof the said Commonwealth has caused its corporate seal to be affixed hereto, and these presents to be signed and delivered in its name and behalf, by its Board of Harbor and Land Commissioners, and the same to be approved by its Governor and Council; and the said Jesse Boynton and Lyman Boynton have hereunto set their hands and seals.

COMMONWEALTH OF MASSACHUSETTS,

[SEAL OF THE
COMMONWEALTH.]

By ALBERT MASON, }
W. P. PHILLIPS, } *Harbor and Land*
FRANCIS A. NYE, } *Commissioners.*

JESSE BOYNTON. [SEAL.]

LYMAN BOYNTON. [SEAL.]

Sales of Back Bay Lands belonging to the Commonwealth from 1857 to 1879 inclusive.

YEAR.	Quantity sold. Square Feet.	Amount.	Average Price per Square Foot.
1857	66,752	\$70,000 00	\$1.048
1858	316,455.5	406,280 53	1.283
1859	6,972	17,430 00	2.500
1860	340,653.5	581,263 71	1.706
1862	40,328	74,351 25	1.843
1863	419,209	871,586 30	2.079
1864	45,797	109,477 65	2.390
1865	59,145	165,925 47	2.805
1866	76,948	136,393 22	1.772
1867	8,848	12,828 48	1.449
1868	42,448	80,164 00	1.888
1869	193,984	384,855 52	1.982
1870	74,776	208,920 20	2.793
1871	172,297	485,093 30	2.817
1872	83,166	284,759 36	3.423
1873	22,960	59,080 00	2.573
1879	114,190.6	359,313 18	3.146
Total	2,084,929.6	\$4,307,722 17	\$2.066

[B.]

REPORT ON REVISION OF HARBOR LINE.

By HENRY L. WHITING.

To the Honorable Board of Harbor and Land Commissioners of the Commonwealth of Massachusetts.

GENTLEMEN, — In accordance with the request of the Board, I have devised a project of harbor lines for that part of the Inner Harbor of Boston which includes the frontage of the city proper; of Charles River, from West Boston Bridge to the United States Navy Yard; of Fort Point Channel, from Dover-street Bridge to its mouth; and the frontage of the South Boston Flats, including the reclaimed and unreclaimed territory as far as Slate Ledge.

I have made the localities referred to a subject of first consideration, from the fact, mainly, that they embrace the oldest and most firmly established business portions of the city bordering upon the harbor, where change is least likely to be demanded, and where it is least practicable to effect it; and also because these lines of frontage form the best bases for extending the project over localities where, perhaps, a less rigid system of harbor line may be required.

The basin of Charles River above West Boston Bridge has been the subject of recent treatment and change in its harbor lines; and still further modifications are contemplated. It seems, therefore, at this particular time, or until the final purpose and character of the basin is determined, inexpedient to revise the present lines. For similar reasons it seems inexpedient at this time to modify the harbor lines in South Bay above Dover-street Bridge.

A further study and examination of various elements which enter into a proper system of harbor lines applicable to Chelsea Creek and Mystic River require more time and preparation than can now be given to them, in order to lay the results before the Board, together with the project herewith proposed.

For the frontage of East Boston, further data and examination is desirable before a suitable system of harbor lines can be devised, and proper continuity with the lines of Chelsea Creek be effected, as well as to secure a better basis for extending the lines eastward, so as comprehensively to provide for and define the improved frontage contemplated by the East Boston Company and the Boston Land Company.

Without entering into a discussion of the principles of compensation or the complicated physical condition of the harbor, it is important to state that the new harbor line so closely follows the present configuration of the harbor outline, as formed by actual structures, — most of which

have been standing for so long a time that the impressions due to their condition and position have already been effected,—that no physical influences caused by such slight deviations from existing outlines as occur have been taken into account. The project has been based, mainly, upon the adjustment of water-spaces to symmetrical lines of frontage best adapted to navigation and occupation. Where the revised harbor line does deviate from the former line, and from existing outlines, it is for the purpose of correcting irregularities and improving the general alignment of the harbor frontage.

In order that the revised harbor line may clearly and in fact define the *actual limits* of the harbor, it has been so projected that it will in no case fall *within* any *existing structure*, except where it may cross the lines of bridges. In some cases it coincides with the outer faces of wharf structures as they now exist, and many of the initial points or points of deflection in it are coincident with the outer corners of present wharves, and the line has been projected with a view to the extension of other wharf and sea-wall structures to it; and it is desirable, if such structures are so brought out, they should coincide as nearly as practicable with the harbor line, while in no case should they extend beyond it.

A practical difficulty exists in carrying out this system where the frontage is defined by *one line* only, as in the former method, which has seemed to me to be an imperfect one for this as well as other harbors for which I have devised schemes of harbor lines. The question at once arises as to what part of the structures built in conformity to it shall coincide with the harbor line. If the coping, which is generally *understood* to be the line of coincidence in the former system, then all parts of structures having “batter” must extend beyond the line prescribed. If the foundation is the line of coincidence, then structures having unequal batter will present at their surfaces or copings a zigzag and irregular line.

To guard against these objectionable features in the scheme, and provide for the construction of more symmetrical lines within legally prescribed limits, I would respectfully suggest for the consideration of the Board the establishing of *two parallel harbor lines*, to be called the *coping and foundation lines*. The distance between these lines should be governed by the approved batter of frontage structures at a given depth. For the Inner Harbor of Boston that of twenty-three feet at mean low water as the standard depth of channel improvements would seem to be appropriate, or the foundation line may be located beyond the base of ordinary structures, so as to give full room for repairs, &c.; for the water-faces of city proper, and for Charles River and Fort Point Channel, a distance of ten feet between the coping and foundation lines would be sufficient to include all probable structures; for the heavier sea-walls of the South Boston Flats and similar structures, twenty feet would be sufficient. By such a system of harbor lines, a symmetrical surface or coping line can be established at a given elevation,—the coping of the dry dock at the United States Navy Yard in Charlestown would be a suitable plane of reference,—while the foundations and submerged portions of all structures can be constructed within lines which shall *in fact* restrict all

encroachment upon the water-spaces reserved by law for navigation and other harbor purposes.

The loss of initial points and the indefiniteness in direction and extent of the old harbor line are probably largely due to unauthorized encroachments. To guard against the future occurrence of this abuse, it might be well to attach a definite penalty to each transgression of the harbor line, and insert a clause to this effect in the licenses granted.

An important feature in the work is the accurate determination and permanent marking of the points in the harbor line. Experience has proved that reference to local objects, even of apparently stable character, is insecure; and this fact was one of the reasons and requirements for a resurvey of the wharf-lines of the upper harbor, and for basing it upon the costly and perfectly determined triangulation of the United States Coast Survey,—the main points in this triangulation being so securely marked as to preserve them from the probable contingencies of accident. It was also a feature in the scheme of the resurvey, to connect each initial point or point of deflection in the harbor line with the points in the harbor triangulation; in fact, to make the points of deflection in the harbor line actual points of triangulation. A practical difficulty, however, arises in the execution of this plan, from the fact that many of the points of deflection in the harbor line will fall in *water*. It became necessary, therefore, to locate and determine by triangulation a point on some actual structure which would be accessible for instrumental occupation, and where local marking could be made as near as practicable to each point of deflection in the harbor line as could not be marked, and to make these points of triangulation "*reference points*" from which the points of deflection in the harbor line could be determined by measured and computed distance and direction. The geographical position of each reference point, and each point of deflection in the harbor line, will be given in tables similar to those for the same class of data published in the last annual report of the Board.

The work of selecting and marking the points in the harbor line has been executed by Mr. William E. McClintock in a most thorough and accurate manner. Each reference point has been located with reference to its future connection with the harbor triangulation; and the observations and measurements referring the reference points to the points of deflection in the harbor line have been made with the same degree of accuracy which has characterized the determinations of the Coast Survey which are the bases of these more minute results. The number of reference points and points of deflection in the harbor line, which have been marked with the copper tacks and iron plates in the manner adopted, amounts in total to sixty-one.

The work of preparing and compiling the larger maps required for the study and project of the revised harbor line has been done by Mr. William T. Blunt in a most accurate and skilful manner. As Mr. Blunt has since left the service of the Board for duty with the Mississippi River United States Commission, I feel it due to him to acknowledge here his energetic and efficient service in connection with this work with the Board.

The only remaining work to be done, in order to make complete the

final determination of the harbor line is that of the observations and computations connecting it with such points and lines in the harbor triangulation as form the best bases for the results required.

I present herewith the detailed description of the location and marking of the harbor line.

Respectfully submitted.

HENRY L. WHITING.

[C.]

STATEMENT OF OPERATIONS DURING THE YEAR ENDING DEC. 31, 1879, ON WORKS FOR THE IMPROVEMENT OF RIVERS AND HARBORS IN THE STATE OF MASSACHUSETTS, UNDER THE CHARGE OF B'VT. BRIG. GEN'L GEORGE THOM, LIEUT. COL. OF ENGINEERS.

I. — IMPROVEMENT OF BOSTON HARBOR, MASSACHUSETTS.

Operations for the improvement of this harbor by the United States Government have been carried on during the year ending Dec. 31, 1879, as follows: to wit, —

1. Under a contract made June 4, 1877, with Mr. George W. Townsend of Boston, Mass., for the breaking-up and removal of about 290 cubic yards of sunken ledges, situated in the main ship channel at the Upper Middle, and near Kelly's Rock in the outer harbor, the contractor broke up and removed to grade, in the years 1877 and 1878, all the ledges remaining in the main ship channel at the Upper Middle, and about 183½ cubic yards of that near Kelly's Rock, leaving 24½ cubic yards near Kelly's Rock to be removed under his contract. This work was resumed by the contractor on the 1st of May, 1879, and completed on the 12th of June, 1879, to the extent called for under his contract.

2. Under a contract made Aug. 15, 1878, with Mr. Joseph E. Bartlett of Boston, Mass., — the lowest of eight bidders, — for the removal of the Man-of-War Shoal (situated in the upper harbor at the confluence of Charles and Mystic Rivers) to a depth of 23 feet at mean low water by *dredging*, at 27 cents per cubic yard, measured in the scows, the contractor completed about 33,000 cubic yards of dredging on the 15th of December, 1878, when he suspended work for the winter. On the 24th of April, 1879, he resumed work under his contract, and has continued it up to the end of the year 1879, during which period he has dredged about 46,000 cubic yards additional, making a total of about 79,000 cubic yards to date; leaving about 5,000 cubic yards to be dredged by him to complete the removal of that shoal.

3. Under a contract made Aug. 26, 1878, with Mr. Isaac A. Sylvester of Quincy, Mass., — the lowest of three bidders, — for breaking up, and removing to a depth of 23 feet at mean low water, the only remaining sunken ledge near Kelly's Rock (containing 145½ cubic yards, measured *in situ*), operations were commenced by him on the 2d of July, 1879, and continued with much energy until its satisfactory completion on the 7th of November, 1879.

4. The reconstruction of the sea-wall, built in 1868 and 1869, at the

south-east bluff of Lovell's Island, was commenced in June, 1878, and was nearly completed on the 9th of December, 1878, when work was suspended for the winter. It was resumed on the 14th of April, and completed on the 21st of June, 1879. All the stone for this work was furnished by contracts, and all the work was done by hired labor. This sea-wall has been increased in thickness and height, and has had a new granite paving placed in its rear, and a rubble-stone apron built in front for the protection of its foundation; and it is believed that it will now be able to resist the violent storms to which it is exposed, and effectually protect and preserve this part of the island.

5. The sea-walls on Gallop's Island, Long Island, Point Allerton, and Deer Island, have all been repaired where most necessary during the past year.

The appropriation of fifty thousand dollars made by Act of Congress, approved March 3, 1879, for the improvement of Anchorage Shoal, the channel at the Lower Middle, and the upper harbor near the mouth of Mystic River, having been made available therefor by the War Department on the 30th of July, 1879, proposals were at once invited for dredging at those places; and the following contracts were made: to wit, —

6. On the 28th of August, 1879, with the New England Dredging Company of Boston, Mass., — the lowest of two bidders, — for

(a) 38,000 cubic yards, more or less, of dredging at Anchorage Shoal, for obtaining a depth of 23 feet at mean low water, at 74 cents per cubic yard, measured *in situ*; and

(b) 6,000 cubic yards, more or less, at the Lower Middle Shoal, for obtaining same depth as above, at 8½ cents per cubic yard, measured *in situ*.

Operations were commenced at Anchorage Shoal, under this contract, on the 15th of September, 1879, and were continued up to the 17th of December, when they were suspended for the winter; resulting in 9,937 cubic yards of dredging *in situ* to that date, whereby the channel has been opened to the required depth for a width of about 350 feet.

7. On the 11th of September, 1879, a contract was made with the New England Dredging Company of Boston, Mass., — the lowest of four bidders (after proposals had been twice invited for the work), — for 50,000 cubic yards, more or less, of dredging in Mystic River, near its mouth, for obtaining a depth of 23 feet at mean low water, at 33 cents per cubic yard, measured in the scows. Operations were commenced under this contract on the 2d of October, 1879, and have been continued up to the close of the year, resulting in about 26,000 cubic yards of dredging under said contract

The dredging to be done at Anchorage Shoal under the present contract (*viz*, 38,000 cubic yards, more or less, measured *in situ*) will open a channel of the projected depth to a width of about 600 feet; whereas the full width projected is to be not less than 1,000 feet, which will require about 80,000 cubic yards of additional dredging.

The dredging contracted for at the Lower Middle Shoal (to wit, 6,000 cubic yards, more or less, measured *in situ*) will open the channel at that place to the full projected width of not less than 650 feet.

The dredging contracted for in Mystic River (to wit, 50,000 cubic yards, more or less, measured in scows) will open a channel of the projected depth to a width of about 100 feet throughout the whole length of the shoal; whereas the full width projected is 300 feet.

From the foregoing statement, it is seen that the work that now remains to be done under the present contracts consists of—

1. The completion of the contract made Aug. 15, 1878, with Mr. Joseph E. Bartlett for the dredging at the Man-of-War Shoal, of which about 5,000 cubic yards now remains to be done.

2. The completion of the contract made on the 28th of August, 1879, with the New England Dredging Company for the dredging at Anchorage Shoal, of which about 28,000 cubic yards remains to be done; and about 6,000 cubic yards of dredging at the Lower Middle Shoal.

3. The completion of the contract made Sept. 11, 1879, with the New England Dredging Company for the dredging at Mystic-river Shoal, of which about 24,000 cubic yards now remains to be done.

The work that has been *completed* up to the 1st of January, 1880, for the improvement of this harbor, consists of the following: viz.,—

- I. The main ship channel has been straightened, widened, and deepened, so as to have a width of not less than 600 feet, and a depth of 23 feet at mean low water at the following places: viz.,—

1. At the west end of Great Brewster Spit.

2. At the south-east and south-west points of Lovell's Island.

3. At the Upper Middle Bar.

Whereby this channel, from the entrance of the lower harbor up to Anchorage Shoal, has a width of not less than 600 feet, and a depth of 23 feet at mean low water (or about 32½ feet at ordinary high water), except at the Lower Middle, where it requires widening.

- II. *Sea-walls* have also been built, for the preservation and protection of the headlands in the harbor, at Point Allerton, Great Brewster Island, Lovell's Island (north and south-east heads), Gallop's Island, Long Island (north head), Rainsford Island, and Deer Island (north, middle, and south heads); which are now generally in good condition.

- III. *Sunken rocks* have also been broken up and removed as follows: viz.,—

Kelly's Rock and all the known sunken ledges near it, Tower Rock, Corwin Rock, the ledges recently discovered at the west end of Great Brewster Spit, and between there and George's Island (all situated in the main ship channel at "the Narrows"), to a depth of 23 feet at mean low water. Barrel Rock in Broad Sound, State and Palmyra Rocks, situated about one-half a mile east of Castle Island, have also been removed.

Surveys and estimates have also been made, and appropriations asked, for completing the following additional work now projected for the improvement of this harbor:—

1. For completing to a least width of 1,000 feet the main ship channel at Anchorage Shoal	\$60,000 00
2. For completing to a width of 300 feet the main ship channel in Mystic River, in the upper harbor	35,000 00
3. For straightening, widening, and deepening the main channel in the upper harbor, from the mouth of Charles River up to Western-avenue Bridge, and thence up to the head of tide-water at Watertown	74,600 00
4. For the repairs of the several sea-walls built for the preservation of this harbor	5,000 00
Adding for engineering expenses and other contingencies, say, ...	20,400 00
Total	\$195,000 00

II. — MERRIMAC RIVER, INCLUDING THE HARBOR OF NEWBURYPORT, MASSACHUSETTS.

I. *Merrimac River above Newburyport, Mass.* — Under the appropriation of five thousand dollars made by the River and Harbor Act of March 3, 1879, the improvement of this river has been continued at the falls between Haverhill and Lawrence, Mass., under an arrangement made with the Pentucket Navigation Company, by which, since the 1st of September last, the channel at the Upper Falls has been straightened and widened, and in some measure improved at the Lower Falls. Numerous sunken bowlders have also been removed from the river at the Upper Falls, Lower Falls, Hazeltine Rapids, and below. The only projected work that now remains to be done at these falls is the removal of a sunken ledge at the Lower Falls, which it is contemplated to have done next season with the funds now available therefor.

By these improvements at the falls, the channel will have 3 feet of water up to the head of tide-water at the foot of the Upper Falls in the lowest stages of the river, at *low tide* with the mill-water at Lawrence *not* running, and about 5 feet of water with the mill-water *running*; whilst at *high* water, with the mill-water *running*, there will be about $7\frac{1}{2}$ feet of water. At the Upper Falls (above tide-water) the channel (as now completed) has a depth of about $4\frac{1}{2}$ feet in the lowest observed stages of the river with the mill-water *running*.

The following work has also been done (in the years 1870–78) for the improvement of this river: viz., (1) the rocky shoals dredged, and numerous sunken bowlders removed from the channel, at and near Rock's Bridge (six miles and a half below Haverhill), including Currier Rock above, and Petty Rock below, the bridge, — greatly improving this the most dangerous part of the river below Haverhill; (2) the channel opened by dredging, for a width of 100 feet, to a depth of 12 feet at ordinary *high* water, at Currier's Shoal (about four miles below Haverhill); (3) also, to the same depth and for a width of 75 feet, at the shoals near the head and foot of Silsby's Island (about one mile below Haverhill); (4) and at Haverhill the shoal between the two bridges has also been improved by dredging, so as to have a channel 10 feet in depth at ordinary high water. The above improvements comprise all that have hitherto

been projected for this river below Haverhill, with the exception of the removal of some more bowlders at Rock's Bridge, for which an appropriation of one thousand dollars has been asked.

2. *Newburyport Harbor, Mass.* — Under the appropriation of ten thousand dollars made by the River and Harbor Act of June 18, 1878, a contract was made Aug. 10, 1878, with Mr. Isaac A. Sylvester of Quincy, Mass., — the lowest of five bidders, — for breaking up, and removing to a depth of 9 feet at mean low water, 800 cubic yards, more or less, of the North (Gangway) Rock, at \$28 per cubic yard, measured *in situ*. Work was commenced under this contract on the 24th of August, 1878, and continued up to the 20th of December, when it was suspended for the winter, during which period about 170 cubic yards of the ledge was broken up, and removed to grade. Operations were resumed by the contractor on the 16th of April, and completed on the 28th of June, 1879, in which time $135\frac{4}{10}$ cubic yards of the ledge was removed to grade, making a total of $305\frac{4}{10}$ cubic yards removed under and in completion of his contract. By this work the channel has an increased width of 60 feet for a depth of 9 feet at mean low water.

In the year 1870 Gangway Rock (situated about 70 yards to the south-east of North Rock) was for the most part reduced to the same grade, — to wit, 9 feet below the plane of mean low water; and the sunken wreck of the schooner "Globe" was also removed.

The additional work projected for the improvement of this harbor consists of (1) removing to grade still more of North Rock, so as to increase the channel 20 feet more in width for a depth of 9 feet at mean low water; (2) completing the removal, to the same grade, of Gangway Rock; (3) the removal, to the same grade, of South Gangway Rock, situated about 120 yards to the south-east of North Rock; (4) breaking up and removing the ledge in the upper harbor, known as "the Boilers," to a depth of 5 feet at mean low water; (5) removing four sunken piers from the channel near the entrance of the harbor abreast of Black Rock's Creek; (6) removing a large sunken bowlder from the channel between the north and south piers. The estimated cost of these improvements is twenty-three thousand dollars, for which an appropriation has been asked; making a total of twenty-four thousand dollars asked for both river and harbor.

III. — PLYMOUTH HARBOR, MASSACHUSETTS.

By the River and Harbor Act of June 18, 1878, the sum of five thousand dollars was appropriated for the improvement of this harbor, about half of which was expended, in 1878, in the extension of the stone bulkhead at the outer end of Long Beach, and in the repairs of other works on that beach where most necessary. This work was resumed in June, and was completed in November, 1879, for a length of about 700 feet along and outside of the wooden crib-work bulkheads, now much impaired by age and storms. This bulkhead, as extended, will give better and more permanent protection to the outer end of the beach.

During the past year all the necessary repairs have been made, and all

the works on the beach are now in a good, effective condition; but, exposed as they are to injury from violent easterly storms, they will necessarily continue to require occasional repairs. These works have been built, from time to time, for the protection and preservation of Long Beach, upon the existence of which this harbor depends. They consist of bulkheads, jetties, and groins, built for the accumulation of sand; and the planting of beach-grass, also to accumulate sand and give permanency to the beach thus formed, whereby a ridge has been formed throughout the whole extent of the beach, which is for the most part covered with beach-grass.

For the improvement of the harbor itself, the sum of ten thousand dollars was appropriated by the River and Harbor Act of March 3, 1875, by which a channel was opened from the Middle Ground up to Long Wharf, a distance of about 2,500 feet, to a depth of 6 feet at mean low water (or 16 feet at mean high water), and for a width of 50 feet.

The project originally provided for a channel, 100 feet in width, to be extended southward to the mouth of Town Brook, a distance of about 900 feet above Long Wharf, so as to form a basin in front of the wharves of the city, 125 feet in width, with a depth of 8 feet at mean low water.

For the completion of this project, the additional sum of twenty-five thousand dollars was asked in my annual report to the Chief of Engineers for 1878, since published by Congress. By the River and Harbor Act of March 3, 1879, the sum of thirty-five hundred dollars only was appropriated for this work; but it has been decided to wait for an additional appropriation before doing any thing further towards its completion.

IV. — PROVINCETOWN HARBOR, MASSACHUSETTS.

All the works projected for the preservation and improvement of this harbor have been completed, except the extension of the stone bulkhead on Long Point. These works are now in good condition, and fully answer the purpose designed. They will, however, require continual watching and occasional repairs, for which purpose an additional appropriation of one thousand dollars has been asked.

Under the appropriation of one thousand dollars, made by the River and Harbor Act of March 3, 1879, 544,480⁴⁸⁰/₂₁₄₀ tons of rubble-stone has been placed on the bulkhead on Long Point, in extension of the same, during the past season.

[D.]

STATEMENT OF OPERATIONS DURING THE YEAR ENDING JUNE 30, 1879, ON WORKS FOR THE IMPROVEMENT OF RIVERS AND HARBORS IN MASSACHUSETTS, UNDER THE CHARGE OF B'VT. MAJ. GEN'L. G. K. WARREN, LIEUT. COL. OF U. S. ENGINEERS.

WOOD'S HOLL HARBOR.

Surveys of this harbor were made in 1873 and 1878, and fifteen thousand dollars appropriated by Congress for dredging and improving its channels. It is understood that considerable work has been done in removing rocks and bowlders since the report of Gen. Warren was made up.

TAUNTON RIVER.

Two thousand dollars appropriated by Congress in June, 1878, has been expended during the succeeding fiscal year in the removal of 232 cubic yards of bowlders from the channel between Weir and Dighton, a distance of six miles.

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